

North Carolina Route 1761 Bridge

(Bridge No. 98)

North Carolina Route 1762, spanning Dan River

Eden Vicinity

Rockingham County

North Carolina

HAER No. NC-38

HAER
NC,

79- EDEN.V,

1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Southeast Region
Atlanta, Georgia 30303

HISTORIC AMERICAN ENGINEERING RECORD

HAER
NC,
79-EDEN.V
1-

North Carolina Route 1761 Bridge
(Bridge No. 98)

HAER No. NC-38

Location: On North Carolina Route 1761, spanning Dan River
Eden vicinity, Rockingham County, North Carolina

UTM: 17.6248.20.4044720
Quad: Brosville

Date of Construction: 1914

Present Owner: North Carolina Department of Transportation
Raleigh, North Carolina

Present Use: Vehicular bridge

Significance: The bridge is 190' feet long and is divided into ten
panels. It also contains a four-panel, 76' Pratt Pony.
Both trusses are pin-connected and have all loop-welded
eyes in their tension members. The all loop-welded
construction shows the quality of steel available was
not able to perform well under the shear forces in the
eye of a pin joint.

Project Information: This documentation was undertaken in 1984 in
accordance with the Memorandum of Agreement with the
North Carolina Department of Transportation as a
mitigative measure prior to demolition.

Inventoried by: George Fore
Division of Archives and History
North Carolina Department of Cultural Resources
1979

Edited by: Paul Hawke, Historian
Southeast Region
National Park Service
Atlanta, Georgia 30303

Retyped and
Transmitted by: Jean P. Yearby, HAER, 1987

BERRY HILL BRIDGE

HAER No. NC-38

(State Line Bridge)

(Rockingham County NC Bridge No. 98)

(Pittsylvannia County VA Bridge No. 6906)

Spanning the Dan River at North Carolina State Route 1761
and Virginia State Route 880

Eden Vicinity

Rockingham County

North Carolina

HAER
NC
79-EDEN.V
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ADDENDUM TO:

NORTH CAROLINA ROUTE 1761 BRIDGE

Eden Vicinity

Rockingham County

North Carolina

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Mid-Atlantic Regional Office
National Park Service
U.S. Custom House, Room 251
2nd & Chestnut Street
Philadelphia, Pennsylvania 19106

HISTORIC AMERICAN ENGINEERING RECORD

BERRY HILL BRIDGE
(State Line Bridge)
(Rockingham County NC Bridge No. 98)
(Pittsylvania County VA Bridge No. 6906)
HAER No. NC-38

This report is an addendum to a one page report previously transmitted to the Library of Congress. The new record name reflects the historic name of the structure.

Location: Spanning the Dan River at North Carolina State Route 1761 and Virginia State Route 880. The bridge straddles the state line and connects Rockingham County, North Carolina with Pittsylvania County, Virginia. For shelving purposes at the Library of Congress, the bridge has been designated as in the vicinity of the town of Eden, North Carolina.

Date of Construction: 1914

Builder: Virginia Bridge and Iron Company
Roanoke, Virginia

Present Owner: Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

Present Use: Vehicular bridge

Significance: The bridge is a fine example of a Camelback truss with integrity intact.

Project Information: The bridge will be demolished and replaced. The Virginia Department of Transportation is responsible for the HAER documentation. The bridge was documented by Mr. Craig Lukevic, Staff Archeologist.

INTRODUCTION

Confusion can result when identifying this bridge, since it straddles the state line; hence, it retains two separate administrative designations for Virginia and North Carolina. In North Carolina, it is the *Rockingham County bridge number 98*, located on State Route 1761 (Figure 1). In Virginia, the bridge is referred to as *bridge number 6906* on Route 880 in Pittsylvania County. But these are designations used by state agencies and not by the people who built the bridge nor by past and present users of the bridge. The state number was unfamiliar to the citizens of Rockingham County, where it is known as the "*State Line Bridge*." In Pittsylvania County, the bridge was named after the approach road which served the historic plantation of Berry Hill, also listed on the National Register of Historic Places. Henceforth, throughout this report, the bridge will be referred to by the historic name, the "*Berry Hill Bridge*."

DESCRIPTION OF THE METAL TRUSS BRIDGE

The Berry Hill Bridge is a steel truss highway bridge which consists of three spans and extends to an overall length of 326' 8". It is a single lane bridge, with a width of 17' 2". The first span is a low pony truss that extends 39 feet from a concrete abutment to the first pier. The second span, the main span, is a through Camelback truss (Pratt) that spans 192 feet from the first pier to the second concrete pier. The third span is a steel beam bridge, angled at a 5.7% grade and extending 39 feet from the second concrete pier to a small, concrete pier located 17' 6" from the southern concrete abutment. A small wooden beam bridge closes this gap, maintaining on the 5.7% grade.

The Camelback truss, span number 2, is a unique accomplishment that demonstrates the art of the metal truss at its height. Going inward from the two ends, the truss grows in height and depth until the highest plane is reached on the top chords at the center. The "bump" in the middle is a distinguishing feature of the Camelback truss and provides the maximum support for traffic local in the center, the weakest area of the truss. Thus, the Camelback truss incorporates a very efficient design for the structure that extends over a large span.

The truss itself is composed of various steel beams and channels. The vertical posts or struts are attached to floor I-beams at regular 19-foot intervals, creating panels that are 19 feet wide. Each post was constructed of two 6" x 2" steel channels located together with 1-1/2" x 1/4" steel bars, resulting in a column 9" wide and 6" deep. These posts vary in length, depending upon their position or proximity to the center of the truss (Figure 3). The center posts connecting panel points U4 and L4, U5 and L5, and U6 and L6, extends to a height of 28' 6"; while the smallest posts, the hip verticals on the extreme ends, only measure 19' in height. With the exception of the hip verticals, the posts act as the rigid support required to withstand the compressive stresses of the traffic load.

These struts intersect with the upper chord members which also resist compressive stresses. The top of each post is joined to the upper chord members by a 3-5/8" diameter steel pin or bolt. Metal pins were the preferred method of connecting major joints in these prefabricated bridges with long spans, which enabled quick and efficient on-site assembly and disassembly. Two 9" x 13.4" steel channels, set 8-1/2" apart, back to back, and riveted to a protective 1/4" thick plate cover form the typical upper chord

member. The end of these members are reinforced by 1/4" gusset plates, where they are joined to the upper struts by a pin or bolt. While the upper chord members are horizontal in the middle of the truss where they connect panel points U4, U5, and U6; they angle downward toward the ends until they intersect with the hip verticals at panel points U1 and U9. Then, the upper chord members become the batterbraces and angle sharply downward to join the lower chord at point L0 and L10. The lower chords are 3" x 3/4" steel eye bars with false die forged or loop welded eyes which connect to the floor I-beams by 3" diameter steel bolts. The 5/8" x 54.7' floor I-beams run transverse to the traffic flow and vary in length from 17' 2" to 16' 3-1/4" in the center of the truss.

The diagonals act as ties and run between the struts, connecting the lower chord with the upper chord at an angle. These members are designed to support the lower chord by uniting it with the upper chord and posts, and to withstand the accompanying tension. The diagonals are steel rods that have a square or rectangular section, which vary from 2 to 3 inches wide. Reaching across and over the roadway, the lateral struts and sway braces unite and brace the upper chords and posts. They are constructed from two "L" pieces, measuring 2-1/2" by 2" with a 1/4" thick, 6' wide protective steel plate joining them. They are in turn braced by 3/4" diameter steel rods with turnbuckles.

The deck surface is constructed from 4" x 8" treated timber planks with a length of 16 feet. The deck is edged with 6" x 6" wheel guard timber beams of 2' lengths, limiting the cartway to a width of 15' 1". In spans number 1 and 2, the deck timbers are nailed to 4" x 6" nailing strips which, in turn, are mounted to stringers at 2' 6" intervals. In span number 2, the through Camelback truss, the stringers are anchored to the floor beam with 1-5/8" bolts in the flange.

The Camelback truss rests on piers 1 and 2. A "nest" of four 2-1/2" diameter rollers support each foot and allows the span to contract or expand during temperature fluctuations. Pier 1 is constructed from two 4' diameter concrete pillars planted 13' apart. The pillars rise 14' above ground level and are connected by 1-1/2' thick concrete webwall. Created from the same construction methods, pier 2 rises 31' from the ground and the pillars are capped with a 6' diameter concrete collar.

Span number 1 is a pony truss which extends 78.8 feet from abutment A to the northern end of the Camelback truss on pier 1. It consists of three posts attached to the floor I-beams at 19' intervals. Two 3/8" x 2-1/2" x 2' "L" pieces create the six posts which reach to a uniform 9' 6-1/2" height. The top chord and batterbraces are made from two 1/4" thick channel pieces joined by two 1/4" thick and 10" wide steel plates.

Span number 3 is a common beam bridge which consists of seven channel beams set parallel to the traffic. The deck and railing are similar to those of the other spans.

These construction techniques represent the state-of-the-art of this period for common highway bridges. They are purely functional and prefabricated at the plant in Roanoke. Through time, if the traffic load increased, this bridge could have easily been disassembled and relocated to a site on a less traveled road, as were many steel truss bridges during the 1950s.

HISTORY OF THE BRIDGE

By 1913, the Pittsylvania County Board of Supervisors acknowledged the need to build a bridge at the ferry to facilitate transportation. On October 24, 1913, the Board of Supervisors agreed to jointly purchase a bridge with Rockingham County of North Carolina:

It is agreed by the Board of Supervisors of Pittsylvania County, the Pittsylvania County agrees to pay one-half of the cost of the erection of the bridge across the Dan at a point on or near the Virginia and North Carolina line, provided that the road leading to the said bridge on the Pittsylvania side is given and opened ready for travel, free of expense to Pittsylvania County, and also provided that the Board of Supervisors of Rockingham County allow and appropriate enough funds to fund the other half [Minutes of the Board of Supervisors, Vol. 6, 194].

On February 2, 1914, the Board of Commissioners of Rockingham County in North Carolina followed the lead of Pittsylvania County and considered the petition of their citizens for the erection of a new bridge across the Dan River east of Draper on the state line. H. H. Williamson of the board motioned to appropriate \$2,500 for the bridge. The motion was carried, with the condition that both counties agree to maintain the bridge jointly and that Rockingham County construct the necessary connecting roads to the existing public road that approaches the bridge [Minutes of the Board of Commissioners of Rockingham County, Vol. 9, 296]. The following spring, Rockingham County advertised for bids in the Manufacturer's Record. The Board of Commissioners reviewed the bids of four companies on April 14, 1914. The lowest bid was presented by the Vincennes Bridge Company for \$14,890. The other bids presented were from the Austin Brothers, the Virginia Bridge and Iron Company, and the Roanoke Bridge Company [Minutes of the Board of Commissioners, Vol. 9, 306]. Although the counties awarded the project to the Vincennes Bridge Company, they never built the bridge. Perhaps the bridge company backed out and the counties contracted with the next lowest bidder, the Virginia Bridge and Iron Company, for \$15,600. Until recently, the Berry Hill Bridge displayed a Virginia Bridge and Iron nameplate that dated to 1914.

No useful records for the maintenance of the bridge exist. Both counties buried the expenses in the general road or bridge fund. It appears that the original bridge was not substantially altered by the maintenance process and remains intact.

The earliest record of maintenance activity on file at the Virginia Department of Transportation is the addition of a u-bolt assembly in 1969 to reinforce a cracked eye-bar on the lower chord of span number 1.

Recently, the Berry Hill Bridge has appeared in the news of southern Virginia and North Carolina. The bridge has become a symbol associated not with truss engineering, but with ritualistic activity. According to Mr. C. D. Vernon, Sheriff of Rockingham County, North Carolina, several adolescent boys claim to have participated in "satanic" rites on or near the bridge. In October 1988, a student from Martinsville, Virginia, informed the sheriff of a plot to abduct another student for a "sacrifice" at the bridge. The police investigated but found no evidence of such activities on the grounds. Later, two boys from Pelham, North Carolina, retold vivid accounts of rituals and animal sacrifices at the bridge. The Sheriff's Department undertook repeated stake-outs but observed nothing suspicious. Counselors at the Moorehead

High School in Eden, North Carolina, have repeated accounts of ritualistic activity from their students to the sheriff. Again, the sheriff investigated the bridge and surrounding farms, including the graveyard at Berry Hill Plantation, a suspected ritual area, for evidence. In spite of all the publicity and hearsay, no evidence of ritualistic activity was observed by the sheriff [C. D. Vernon, personal communication, 1989].

HISTORY OF THE BERRY HILL ROAD AND FERRY

Travelers crossing the Dan River at Berry Hill Road, currently Route 880, is an activity that has occurred continuously since the Colonial Period. The Berry Hill Road serves Route 863 by connecting it to Gravel Hill Road across the Dan River in North Carolina. Surveyed by Captain Peter Wilson in 1747, Route 863 is an early arterial road that parallels the Dan River. The road connects the colonial era plantations of Bachelor's Hall, Oak Hill, and Berry Hill to the Sandy River [Clement 1982:410].

The early history of Berry Hill Road and ferry, which predates the bridge, was shaped by the early settlers. The lands near Route 880 and the environs on both sides of the Dan River were purchased by Nicholas Perkins in 1755. His son, Colonel Peter Perkins, inherited one-half of his father's lands including the nearby Berry Hill Plantation and operated it with 25 slaves by 1782. Peter Perkins' brothers, Nicholas and Constant, inherited his father's land on the southern side of the Dan River [Clement, 1982:41]. It is quite probable that Route 880 was a trail which connected the holdings of the Perkins family by the third quarter of the 18th century. By 1776, Peter Perkins had established a ferry at or near the site of the Berry Hill Bridge.

The Perkins' Ferry was one of several ferries along the Dan River to have played an important role in the events of the Revolutionary War. The ferry and Berry Hill Plantation served as a rendezvous point for the militia under Captain Isaac Clement and Lieutenant Benjamin Duncan in May 1780, before heading south across the Dan River [Clement 1929:167]. In February 1780, an exhausted force of 1,600 men and horses, under the command of General Nathaniel Greene, was evading the British Regular of Lord Cornwallis. The British were trying to destroy Greene's forces while it eluded Cornwallis by marching north to Virginia from North Carolina. Lord Cornwallis attempted to pin Greene's forces against the Dan River. General Greene sensed the British would attack his force when it would be the most vulnerable, crossing a river. Greene set a force of 700 light infantry to decoy the British to the most obvious crossing. Meanwhile, Colonel Edward Carrington orchestrated the crossing operations at Irwin's ferry, Dix's ferry and Perkins' ferry. When Lord Cornwallis realized he was misled, the Continental Army had crossed the Dan River and was out of reach due to rising unfordable flood waters [Frances Hallam Hurt 1976:127]. The Continental Army recuperated along the northern bank and in several plantations, including Berry Hill.

Later that spring, in March, Colonel Peter Perkins commanded a regiment of Virginia militia at the Battle of Guilford Courthouse. After the battle, the Berry Hill Plantation became a makeshift hospital as did the neighboring plantations of his brothers and William Harrison's plantation of Oak Hall. Colonel Peter Perkins was in charge of the hospital and supplied it from his plantation and a depot in Peytonsburg. The hospital operated for three months and developed into a complex equipped with a forge and commissary and served by 43 horses [Clement 1959:39]. The medical operations of the hospital were supervised by Dr. Daniel Brown from New York and Dr. Elijah Gillett [Clement 1982:183].

Another element of the hospital was the ferry. After the war, Sherwood Toney filed a claim for compensation for his duties as the ferryman for the hospital. Toney claims to have ferried 252 men, 117 horses, 14 wagons and artillery across the Dan River [Hurt 1976:26]. Physical evidence of military activity appeared in 1890 when the Dan River flooded and exposed Revolutionary War Period camp equipment [Madalene Vaden Fitzgerald 1974:94].

After the war, Peter Perkins, who owned the land in both states, moved to Stokes County in North Carolina. His son, Nicholas, who acquired the Berry Hill tract by 1800, sold the 700-acre tract to his cousin, Peter Wilson. Wilson married Peter Perkins' granddaughter, Ruth Stoval Hairston, and constructed a federal-style house in 1812. The house still stands and is listed on the National Register of Historic Places (National Register nomination form for Berry Hill, 1977).

The Berry Hill Road and Perkins' ferry probably continued to operate throughout the 19th century. Herman Boye's map of 1825 and 1859 depicts the Berry Hill Road branching off of Route 863 to cross the Dan River and connecting with North Carolina. In 1887, a map entitled "Dan River from Madison to Danville" depicts improvements and dams along the river in Rockingham County, North Carolina. It also shows the Berry Hill Road and labels Perkins' Ferry as "Daniel's Ferry" with a structure in nearby North Carolina belonging to a Mr. Daniel [S. T. Albert 1887].

HISTORY OF THE VIRGINIA BRIDGE AND IRON COMPANY

Virginia Bridge and Iron Company, manufacturer of the Berry Hill Bridge, was the largest fabricator of steel structures south of Pittsburgh. Locally known as "the Bridge Works," the Virginia Bridge and Iron Company began in Roanoke, Virginia, and played a major role in the economic development of the city. The firm started as the American Bridge Company during 1889 in the recently-established city of Roanoke. It is possible that the American Bridge Company was a descendant of the New Jersey Bridge and Iron Company, founded in 1861, which was an aviator of the Delaware Manufacturing Company of 1937 [William Kessler of USX, personal communications, 1989]. The small foundry encountered financial difficulties and was reorganized into the Virginia Bridge and Iron Company in 1895. At the time of the incorporation, the company employed 50 to 70 men and retained a value of \$50,000 [Jack and Jacobs 1912]. Initially, the firm constructed light highway bridges and steel structures, but they soon expanded and diversified. By 1904, the plant occupied 10-1/2 acres and consisted of a bridge shop, a girder and machine shop, and a new office building. The company had acquired late model equipment including punching, riveting, sawing, milling machines and lathes powered by 100 horse-power engines. Other investments included air compressors for pneumatic hand riveters, cranes and lifts. At this time, the company employed 175 men in the shop and 150 in the field to perform erections. The annual output was about 12,000 tons of steel. Aside from bridges, the Virginia Bridge and Iron Company was engaged to assemble turntables, factories, warehouses, and other steel structures throughout the southeast. Notable projects included the Norfolk and Western Railway shops at Portland, Ohio, and rolling mills for the Knoxville Iron Company [I. J. Isaacs 1904: 36, 37].

In 1907, the Virginia Bridge and Iron Company was considered to be a success story by the Chamber of Commerce and controlled a capital of \$550,000. Extensive additions were built in 1907 which entailed new fireproof shops and a girder shop with heavy cranes. Night shifts became common and the work force was augmented from 300 to 450 employees. Another shop which employed 175 people opened in

Burlington, North Carolina. Other branch offices were established in Atlanta and Little Rock [E. B. Jacobs 1970:15, 16]. One year later, the Virginia Bridge and Iron Company constructed a major plant in Memphis, Tennessee.

The expansion continued. In 1910, the Virginia Bridge and Iron Company employed 600 men and produced 45,000 to 100,000 tons of steel product a year. The central office was located at the Roanoke plant, which housed 100 engineers, draftsmen, stenographers, and executives. Heavy railroad bridges were the principal product, and the firm provided for the major railroad lines throughout the south and southwest as well as Mexico. Steel railroad cars were also produced in quantity, as attested to by the production rate of 3,000 in 1910. During the first world war, the Virginia Bridge and Iron Company fabricated the steel for mercantile shipping.

The company continued to expand and establish itself throughout the southwest and the rest of the country. By 1922, a new plant was built in Birmingham, Alabama, and additional plants were in production by 1933 in New York, Los Angeles, New Orleans, El Paso, and Dallas. By 1934, the Virginia Bridge and Iron Company was the third largest steel fabricating company in the United States. The Federal Government awarded the Virginia Bridge and Iron Company with the contract to fabricate four drum gates destined for the Panama Canal. Other varied products included tanks, hydroelectric plant, and steel stadia [The Roanoke Times, January 29, 1934].

The Great Depression brought the years of expansion to a halt. Plants operated at 20% capacity and its economic strength waned. In January 1936, the Virginia Bridge and Iron Company was sold to the Tennessee Iron, Coal, and Railroad Company, a subsidiary of U.S. Steel, and the former's name was changed to the Virginia Bridge Company [The Roanoke Times, January 24, 1936].

The Virginia Bridge Company continued to produce the same products, but the top officers were changed. The second world war was a time of heavy production loads for the firm. the bridge works produced the buildings, cranes, and dry docks, when the U.S. Navy upgraded their facilities in Norfolk, and constructed a new bakery structure for the National Bisquit Company. Other projects included the Sugar Bowl and Orange Bowl stadia. By 1942, the bridge works produced \$10,000,000 worth of goods and maintained 1,800 people on the payroll [Writer's Program 1942:204].

The Virginia Bridge Company was assigned to the American Bridge Company when it merged with U.S. Steel in 1951. The last Virginia Bridge Company plant closed in the 1960s during a period of labor unrest [Kessler, personal communication, 1989].

In a city founded on the capital transplanted from the northern industrial region, the Virginia Bridge and Iron Company boasted of being a local company founded on independent capital. The founding officers: Tipton, T. Fishburne, Rueben H. Fishburne, J. J. Fishburne, W. E. Robertson, W. B. Beville, E. L. Stone, and Charles Edward Michael were all from western Virginia, with the exception of the latter. The Fishburne brothers, who began by running a tobacco business, were involved in many local businesses. Tipton T. Fishburne, for example, was vice president of the Virginia Bridge and Iron Company and the Stone Printing Company. He was also president of the Twin Mill Corporation and of the Roanoke Hospital Association. Tipton and his brothers became involved in banking. Charles Edward Michael moved from Maryland to Roanoke in 1889 to work at the American Bridge Company. In

in 1892, he became the secretary and treasurer of that firm, a position he retained throughout the reorganization of the company to the Virginia Bridge and Iron Company in 1895. Michael was elected vice president and general manager until 1904, when he became president. Under his tenure, the Virginia Bridge and Iron Company grew to be the second largest bridge works in the country, until the Depression. The limited information available sheds little light on other employees.

SOURCE

There is a serious problem with the sources in the history of the Virginia Bridge and Iron Company. All of the corporate records of the firm were transferred to a five-story library at the U.S. Steel headquarters in Pittsburgh. All of the records and the library were destroyed recently, when the U.S. Steel Corporation was reorganized into U.S.X. Corporation [Kessler, personal communication, 1989]. According to the limited published sources, the Virginia Bridge and Iron Company became a pillar of the community and a force towards progress. These sources, however, are somewhat biased. The literature produced by the Chamber of Commerce, of which C. E. Michael was president, extolled glowing reports of the company. Local history books were published by the Stone Printing Company, of which T. T. Fishburne was an officer. It is interesting to note that various local histories designate only a small paragraph to cover the role of the Virginia Bridge and Iron Company in the city.

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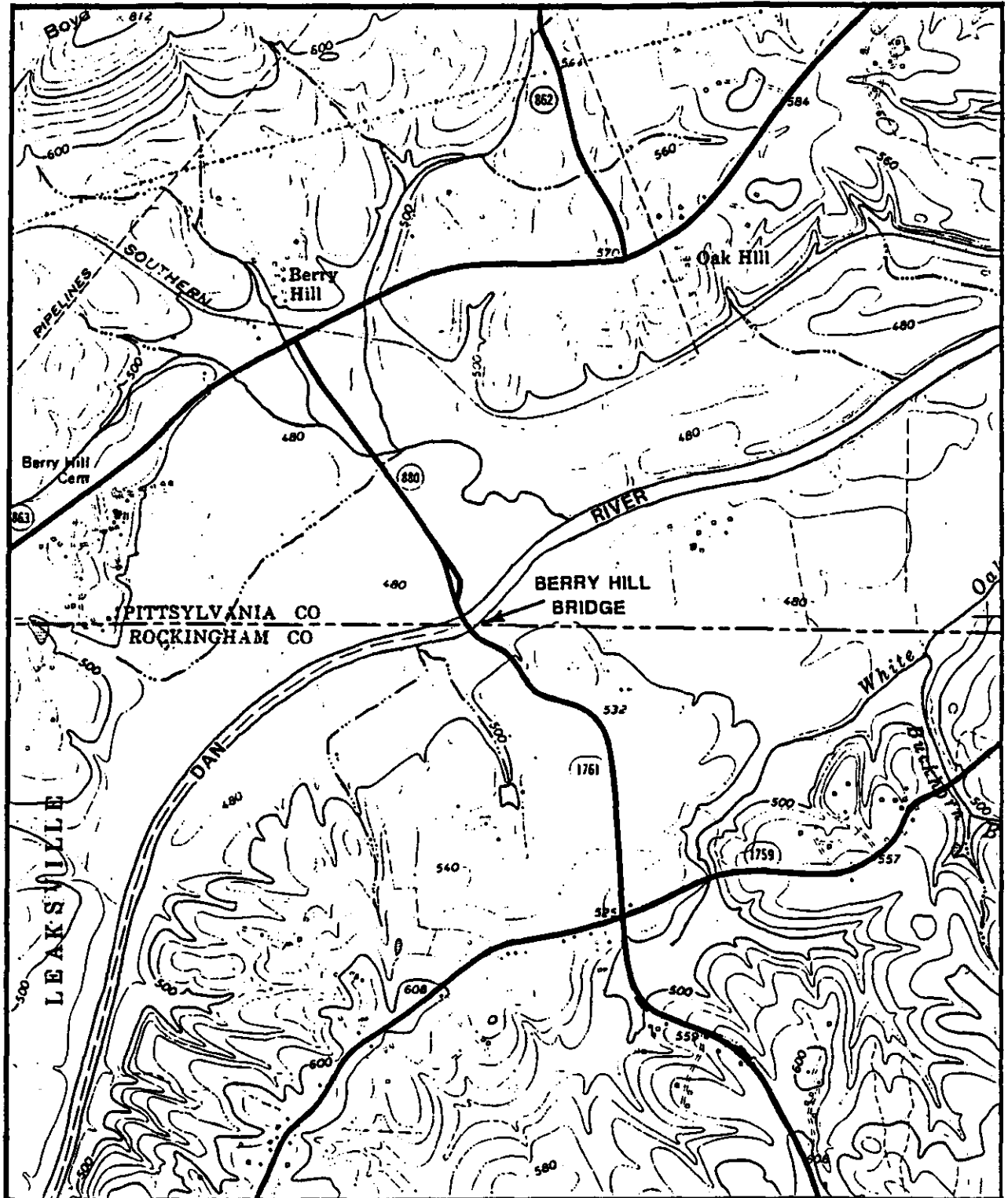
Pittsylvania County Courthouse at Chatham, Virginia. "Minutes of the Board of Supervisors", Vol. 6, page 194.

Rockingham County Records at Wentworth, North Carolina. "Minutes of the County Commissioners", Vol. 9, pages 296, 305.

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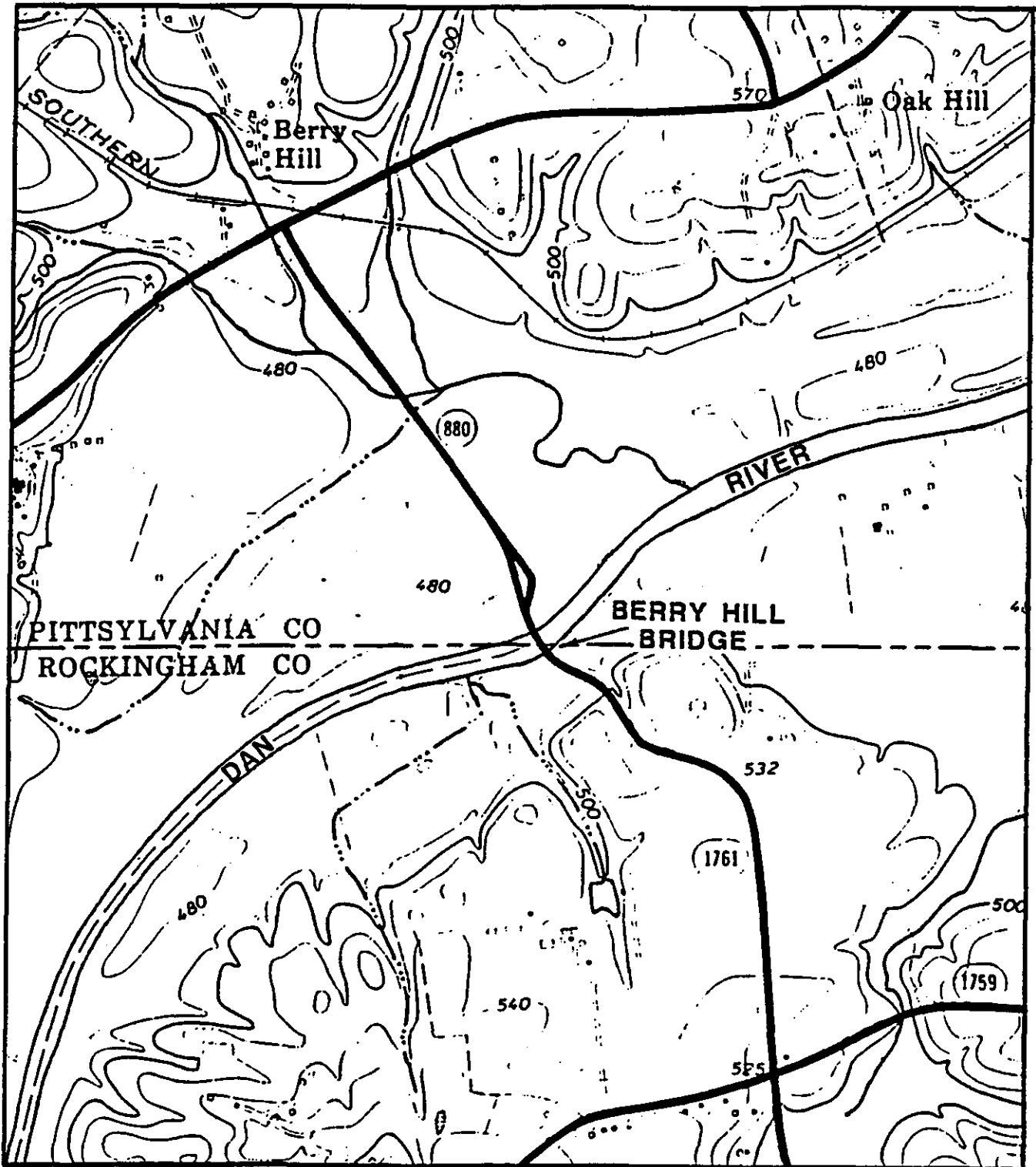
Kessler, William. Telephone conversation, January 1989.

Vernon, C. D. Interview with author. Wentworth, North
Carolina, September 1989.

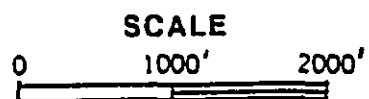


LOCATION PLAN





SITE PLAN



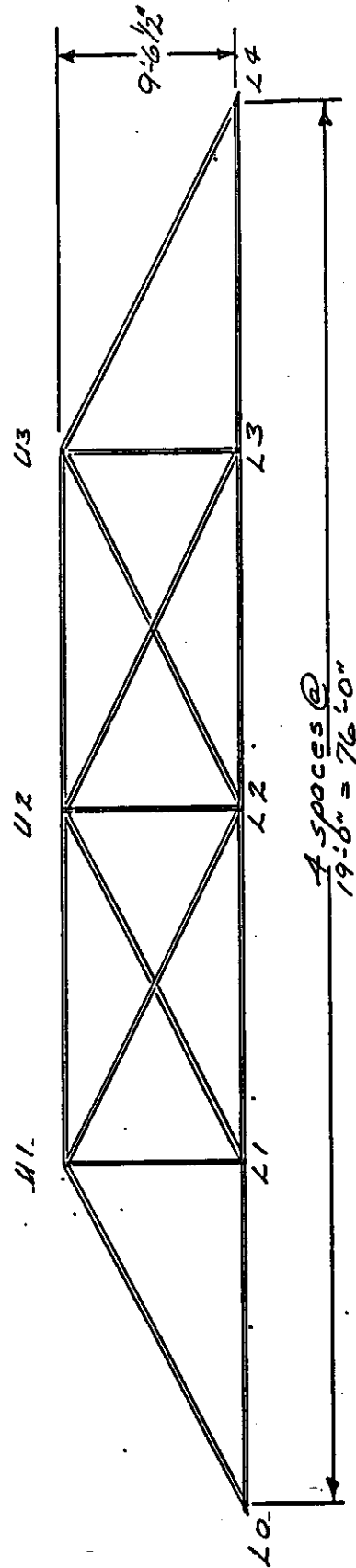
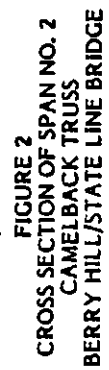


FIGURE 1
PROFILE OF SPAN NO. 1
PONY TRUSS
BERRY HILL/STATE LINE BRIDGE



**FIGURE 2
CROSS SECTION OF SPAN NO. 2
CAMELBACK TRUSS
BERRY HILL/STATE LINE BRIDGE**

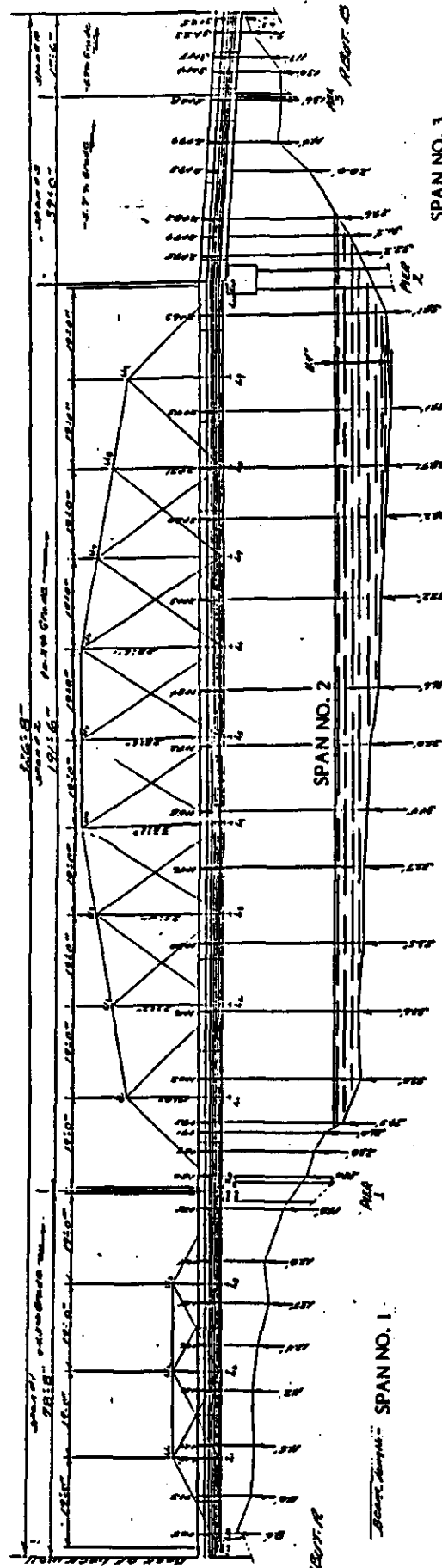


FIGURE 4
PROFILE OF ENTIRE
BRIDGE COMPLEX
FACING EAST